Claims

1. A composition comprising:

(i) a fatty phase; and

(ii) a nonzero quantity of an organometallic gel, wherein the organometallic gel comprises a complex of an anionic polymer, or a mixture of different anionic polymers, with a multivalent metal cation or a mixture of different multivalent metal cations.

2. The composition of claim 1, wherein the organometallic gel comprises a mixture of a volume Vc of a suspension, or solution, comprising multivalent cation salt or a mixture of multivalent cation salts, with a volume Vp of suspension, or solution, comprising anionic polymer or a mixture of anionic polymers.

3. The composition of claim 1, in which the fatty phase comprises oils of inorganic, plant or animal origin; alkyl esters of said oils; alkyl esters of fatty acids; alkyl ethers of fatty acids; esters of fatty acids and of polyols; ethers of fatty alcohols and of polyols; or a combination thereof.

4. The composition of claim 3, wherein the alkyl esters of oils comprise methyl esters, ethyl esters, linear or branched propyl esters, linear or branched butyl esters of said oils, or a combination thereof.

5. The composition of claim 3, wherein the oils comprise white mineral oils, peanut oil, olive oil, sesame oil, soybean oil, wheatgerm oil, grapeseed oil, sunflower oil, castor oil, linseed oil, soybean oil, corn oil, copra oil, palm oil, nut oil, hazelnut oil, rapeseed oil, squalane or squalene from olive or extracted from fish livers, or a combination thereof.

6. The composition of claim 3, wherein the alkyl esters of fatty acids comprise fatty acid esters comprising 12 to 22 carbon atoms.

7. The composition of claim 3, wherein the alkyl esters of fatty acids comprise ethyl oleate, methyl oleate, isopropyl myristate, octyl palmitate, or a combination thereof.

8. The composition of claim 3, wherein the esters of fatty acids and of polyols comprise fatty acid monoglycerides, fatty acid diglycerides, fatty acid triglycerides, esters of fatty acids with a polyglycerol, esters of fatty acids and of propylene glycol, esters of fatty acids with a hexol, or a combination thereof.

9. The composition of claim 1, wherein the composition comprises between about 5% and 70% by weight of fatty phase.

10. The composition of claim 1, wherein the multivalent metal cation, or mixture of multivalent metal cations, comprises divalent, trivalent metal cations, or a combination thereof.

11. The composition of claim 2, wherein the suspension, or solution, of multivalent cation salt or mixture of multivalent cation salts, comprises a concentration of metal cations [C], expressed in mol/liter of solution or suspension, between about 10^{-3} and 10 mol/liter.

12. The composition of claim 2, wherein the multivalent cation salt, or mixture of multivalent cation salts, comprises hydroxides, carbonates, citrates, gluconates, glucoheptonates, fructoheptonates, lactates, acetates, propionates, salicylates, chlorides, or glycerophosphates, of said cations, or a combination thereof.

13. The composition of claim 12, wherein the multivalent cation salt, or mixture of multivalent cation salts, comprises calcium hydroxide, magnesium carbonate, manganese carbonate, calcium gluconate, manganese gluconate, manganese glycerophosphate, zinc gluconate, calcium fructoheptonate, aluminum salicylate, aluminum acetate, or a combination thereof.

14. The composition of claim 13, wherein the multivalent cation salt, or mixture of multivalent cation salts, comprises manganese glycerophosphate or a mixture of manganese glycerophospate and manganese gluconate.

15. The composition of claim 2, wherein the anionic polymer, or mixture of anionic polymers, comprises sulfated polymers, dextran, carrageenans, carboxylic polymers, polyacrylates, pectins, alginates or natural gums, xanthan gum, guar gum, or a combination thereof.

16. The composition of claim 2, wherein the anionic polymer, or mixture of anionic polymers, comprises sodium alginate.

17. The composition of claim 2, wherein the suspension, or solution, of anionic polymer, or mixture of anionic polymers, comprises a concentration of anionic polymers [P], expressed as a percentage by weight of the suspension or solution, between about 0.1% and 10% by weight.

18. The composition of claim 2, wherein the [P]/[C] ratio is between about 0.01 and 100.

19. The composition of claim 2, further comprising at least one solvent of said suspensions, or solutions, said solvent comprising water.

20. The composition of claim 19, wherein the organometallic gel comprises a mixture of an aqueous suspension, or solution, comprising a multivalent cation salt with an aqueous solution, or suspension, comprising an anionic polymer.

21. The composition of claim 1, wherein said composition is in the form of an emulsion with a continuous phase comprising the fatty phase and a dispersed phase comprising the multivalent metal cation-anionic polymer gelled complex.

22. The composition of claim 1, wherein said composition further comprises one or more pharmaceutically acceptable surfactants.

23. The composition of claim 22, wherein the one or more surfactants comprise nonionic surfactants.

24. The composition of claim 22, wherein the one or more surfactants comprise a hydrophilic-lipophilic balance (HLB) between about 4 and 12.

25. The composition of claim 22, wherein the composition comprises between about 0.5% and 10% by weight of the one or more surfactants.

26. A method for preparing an emulsion, comprising:

(a) preparing an aqueous suspension, or solution, containing at least one water-soluble anionic polymer, at least one hydrophilic surfactant, or combination thereof;

(b) emulsifying the suspension prepared in step (a) with an oily phase; and

(c) neutralizing the final emulsion obtained.

27. The method of claim 26, wherein step (a) further comprises mixing a volume Vc of a suspension, or solution, of cation salt with a volume Vp of a solution, or suspension, of anionic polymer, in a Vc/Vp volume ratio of between 1/100 and 1/1, either by pouring the suspension, or solution, of cation salt into the solution, or suspension, of anionic polymer, or by pouring the solution, or suspension, of anionic polymer into the solution, or suspension, of cation salt.

28. The method of claim 26, wherein said method further comprises dissolving the neutralized final emulsion of step (c) in a solvent of a fatty phase to obtain a suspension of organometallic gel and centrifuging the suspension of organometallic gel to isolate the organometallic gel.

29. A method for preparing a vaccine, comprising adding, as immunity adjuvant, an effective quantity of the composition of claim 1.

30. A composition comprising at least one antigen or at least one generator in vivo of a compound comprising an amino acid sequence and a nonzero quantity of the composition of claim 1.

31. The composition of claim 2, wherein the volume Vc and the volume Vp are in sufficient proportions to cause the gelling phenomenon of the organometallic gel.

32. The composition of claim 6, wherein the fatty acid esters comprise esters of myristic, palmitic, oleic, ricinoleic and isostearic acids.

33. The composition of claim 8, wherein the esters of fatty acids and polyols comprise esters of fatty acids with sorbitol or mannitol, and esters of fatty acids with hexol anhydride.

34. The composition of claim 8, wherein the esters of fatty acids and polyols comprise esters of fatty acids with sorbitan or mannitan.

35. The composition of claim 9, wherein the composition comprises between about 15% and 60% by weight of fatty phase.

36. The composition of claim 10, wherein the divalent metal cations comprise divalent cations of calcium, magnesium, manganese, zinc, or a combination thereof.

37. The composition of claim 10, wherein the trivalent metal cations comprise trivalent cations of iron, aluminum, or a combination thereof.

38. The composition of claim 11, wherein [C] is between about 10^{-2} and 5 mol/liter.

39. The composition of claim 38, wherein [C] is between about 0.1 and 1 mol/liter.

40. The composition of claim 17, wherein [P] is between about 0.5% and 5% by weight.

41. The composition of claim 40, wherein [P] is between about 1% and 5% by weight.

42. The composition of claim 18, wherein the [P]/[C] ratio is between about 0.1 and 50.

43. The composition of claim 42, wherein the [P]/[C] ratio is between about 1 and 10.

44. The composition of claim 23, wherein the surfactants comprise nonionic surfactants from esters of polyglycerols, esters of sugars, esters of ethoxylated sugars, alkoxylated fatty alcohols, ethoxylated fatty acids, monoglycerides and diglycerides modified by reaction with acetic acid or lactic acid, ethoxylated monoglycerides, diglycerides or triglycerides, ethers of sugars, or a combination thereof.

45. The composition of claim 45, wherein the esters of sugars comprise esters of sorbitan, mannitan, sucrose, or a combination thereof.

46. The composition of claim 45, wherein the ethers of sugars comprise glucose ethers, xylose ethers, lactitol ethers, or a combination thereof.

47. The composition of claim 24, wherein the one or more surfactants comprise an HLB between about 5 and 8.

48. The composition of claim 25, wherein the composition comprises between about 1% and 5% by weight of the one or more surfactants.

49. The method of claim 26, wherein the oily phase comprises a lipophilic surfactant.

50. The method of claim 26, further comprising, following step (b), solubilizing an insoluble multivalent cation salt by modifying the pH of the emulsion.

51. The method of claim 26, further comprising, following step (b), adding an excess of multivalent cation.

52. The method of claim 27, wherein the Vc/Vp volume ratio is between about 1/50 and 1/10.